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UNITED STATES OF AMERICA

ENVIRONMENTAL PROTECTION AGENCY

BOSTON REGION

In the Matter of:

PUBLIC HEARING

RE: SUPERFUND PROGRAM, NEW BEDFORD HARBOR SITE, New Bedford, Massachusetts.

Council Chambers
Town Hall
New Bedford, Massachusetts

Monday
September 25, 1989

The above entitled matter came on for hearing, pursuant to Notice, at 7:15 o'clock p.m.

BEFORE: Leon Chadwick, Chairman

Lydia Van Hime, Secretary

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PROCEEDINGS

7:15 P.M.

THE CHAIRMAN: 7:15. We'll call this meeting to order.

We'd like to set a little bit of ground rules to start with. Basically, what we'd like to do is on the questions, we're going to separate the questions. In fairness to all, we'll flip a coin to see who goes first. But whoever wins the toss of the coin, whether it be EPA or the PRPs, those questions will be addressed first, hopefully for the first forty five minutes.

If it runs out before that time the same amount of time will be given to the next group. We're here mainly to get some questions answered. We're not here to have arguments between one side or the other. It's to answer some questions for the group, so that we can get our work completed on time.

So I have a coin. You've got one? Fine. Okay, so it will be Frank.

MS. VAN HIME: Heads we win, tails you lose. Heads it is.

THE CHAIRMAN: And the other thing that we'd like to do is that we'll take the questions from the members of the work group and our consultant first. If, at the end of that period, then we would take some questions from anybody else from the general public. But we need to get our questions answered first.

Oh, and the other thing is, if you're going to ask a question you need to come up to one of the first three microphones here, and preferably whoever the person is you're asking, whoever is going to answer for that group, should sit at one of the others. It is being recorded, on the request of Frank's boss at EPA.

MS. VAN HIME: Don't be shy, guys.

MR. CIAUITIERI: Before anybody asks any questions of EPA, let me just make a statement, a short statement.

My name is Frank Ciauitieri. I'm the remedial project manager for EPA. And, as has been indicated here, we are here tonight for the purpose of responding to any questions that the community work group or other members of the public.

MR. NICKERSON: I want you to speak louder, Frank, because otherwise you're talking only to the chair.

MR. CIAUITIERI: I can't hear.

MS. VAN HIME: He wants you to speak up.

MR. CIAUITIERI: We're here for the purpose tonight to answer any questions that the members of the community work group, or the members of the public, might have.

As it's been indicated, this is on the record, we ask that when you ask your question, or if you respond to a question, that you identify yourselves.

For those of you who may not know, we have again extended the public comment period for the project from October 2nd to October 16th, at the request of the PRPs, so you have until that period to submit any further comments or questions on EPA's proposed plan.

Having said that, I will be available to answer any questions. I probably won't answer many myself, but I will ask the team of people who are with me to do that.

THE CHAIRMAN: Okay, thank you, Frank. Yes?

MS. VAN HIME: I think we want to point out, last week -- my name is Lydia Van Hime. Last week we had an executive session here, a closed session of simply group members. And it was a very good meeting, and a lot of issues were brought up, and people had a lot of questions. And I've made some notes on those questions, and I assume that the people who asked the questions, and brought up the issues that we talked about, remember. I mean, you know what we were talking about, and what our issues were, and where our concerns were.

And those questions need to be answered, or at least talked about, but we are not restricted to those. I see this as an informal a session as possible. And in terms of time for people to answer questions, if somebody's got twenty minutes or a half hour worth of stuff, we might ask you to cut it down a bit, but we're not standing on precedent here or anything like that.

We have group members Peter, Curt, George, Lydia, Leon, and Howard. And Donald. I'm sorry, Donald.

So whoever would like to go first, please speak up.

THE CHAIRMAN: You have to go over to one of the others there.

MR. SZWAJA: My name is Pete Szwaja from the community. Basically I have a couple of questions, the first one being directed to the EPA. And that is, with the additional costs of what we're going to do with the material after it's gone through the processes of incineration, and we know that we have metals in it. Are we looking at an increase in the total cost that was basically estimated at a little over $14 million? Or are we still going to stick to that as being the cap for the costs of the clean up?

MR. CIAUITIERI: The costs that were quoted in the feasibility study included the total costs for all treatments, incineration as well as fixation of the metals. The only costs not included in there were any land costs.

MR. SZWAJA: But you also mentioned that it was only a temporary storage facility or storage site that this material was going into, meaning that eventually this material would have to be removed from the temporary site, and disposed of at some other place?

MR. CIAUITIERI: Yes. We said that it's temporary in that the final disposition of that incinerated and fixed material would be dependent on the solution that was chosen in the second operable unit for the harbor. It could be that it would stay there, it could be that something else would be done with it. It's interim on that basis.

Now it is possible that we would have to include costs in the second operable unit to do something else with it. We don't know that yet.

MR. SZWAJA: Okay. So really that cost is just being transferred over to the second operable unit cost, even though we know that now it exists, and there's going to be a cost.

MR. CIAUITIERI: If there is a cost to remove the material and do something else, yes, that would be. But we don't know whether there will be a second cost, because we haven't completed that second decision yet.

MR. SZWAJA: Okay. During our meetings you mentioned that there's a modeling still going on, and eventually the modeling will be used to determine how long you're going to have to go for the clean up of the estuary being 50 parts per million/ten parts per million or one part per million, or whatever the case may be. Has anybody come up with any conclusions on that modeling, or is that still an ongoing process?

MR. CIAUITIERI: We have made some runs on the model, but not to the point where I think we would want to make public statements or make any definite conclusions. I think we did, and will be, at some point in the very near future, coming to the community work group with the results of those modeling studies which, have you have indicated, set some kind of clean up level that would be necessary to achieve overall harbor clean up.

MR. SZWAJA: Okay, that's the only two I have right now. Thank you.

MR. CIAUITIERI: I should point out, just to add on, that nothing that the proposal that EPA has put forth for removing and treating the hot spot, certainly removing and treating would not be inconsistent with any clean up level, since we would have none of those PCBs left.

MR. HAYDOCK: I'm George Haydock of the community group. There are two or three questions that I have, Frank. One of the criticisms that was brought up was that your pilot study was in an area where the concentration of PCBs was relatively low, and with this there was very little spreading of PCBs in the plume, or suspension. And is there any reason to feel that when you move into the high concentrations, the 100,000 parts per million, or this sort of thing, that when you're get dredging you're going to have a more significant problem with the spread of the PCBs?

MR. CIAUITIERI: I'm going to let Mark Otis, from the

Corps of Engineers, answer part of that question.

I would point out that when we did the pilot dredging disposal study, that we deliberately chose an area of moderate PCB levels, because we did not want to take the risk of finding out that we weren't able to dredge safely, and then cause a problem by virtue of operating in a very high level area. So that was a deliberate choice.

And the assumption there, and I'll let Mark speak more on this, was that the results of that will be able to be scaled up into the higher concentrations that we would be dealing with in the overall estuary clean up.

Maybe, Mark, you could pick up from there.

MR. OTIS: Okay, Mark Otis from the Corps of Engineers. What the pilot study showed us was that we were able to dredge, and we were able to minimize the resuspension of sediment, and we were also able to minimize any spread of contamination away from the point where we were working.

The same physical processes would take place working in an area of higher contamination, and that we would be able to minimize resuspension.

We used the data from the pilot study to basically improve our ability to estimate contaminate releases associated with the operation. Using laboratory tests from both areas we'll be able to make estimates for what contaminate release would be associated with working in an area of higher contamination.

You would expect that you will get higher levels working up in the hot spot area. We feel confident that we can make relatively good estimates of what they will be.

Our concern at the pilot study was not allowing an escape of contamination outside the upper estuary. We kind of picked the Coggeshall Street Bridge as a barrier, as our monitoring point, and we weren't too concerned what happened above that. Our concern was we didn't want any contamination spreading into the lower harbor.

With the hot spot being located at the northern extreme of the harbor, you'd have that working in your advantage, even if you had increased levels of contaminate release. You'd be that much further away. And I think your concern would be the same, you'd be worried about releases into the lower harbor, not so much what happens in the immediate vicinity in the upper estuary.

MR. HAYDOCK: If you are expecting some increase in resuspension does it make sense, as has been suggested in the covering of the estuary, to put a weir at the Coggeshall Bridge, so that any of this that is spreading down will not spread further into the lower harbor, or the middle harbor?

MR. OTIS: I think what we feel, from the projections we've made, as far as the levels that would be released, it's not a significant enough factor to warrant the kind of expenses, and also the kind of impacts associated with putting in a structure there.

MR. CIAUITIERI: We had decision criteria, as you are aware, during the pilot dredging and disposal study, which basically operated on the premise that there would be no increase, no statistically significant increase above background.

In other words, whatever was going underneath the Coggeshall Bridge on a routine basis, absent any work or any construction in the harbor, that was background.

We then said that as long as we didn't increase that statistically significantly, or basically two times that at any stretch, that there would be no measurable environmental harm, and we even had environmental indicators in place. We had fish. We used fish, clams, to make sure that nothing happened.

As you may know, as we reported to you a couple of times now, during the operation of the pilot study there were no significant increases in background. In other words, the PCBs going under the bridge did not change as a result of our activities.

We have indicated that during the proposed dredging of the hot spot, that same rationale would be put in place. That we would continue to monitor discharges underneath the bridge, and if there was any statistical increase that we would shut down the operation and increase our controls.

We have no reason to believe, based on all the work we did in the field studies, and the pilot study, and that's real field data, not just desk top projections, to believe that there would be any significant increase.

The time of dredging, the amount of dredging, is not in any large scale, as compared to what we're did, so when we're talking about dredging, about the same amount of time, but the same volume of materials, as Mark has indicated, the proximity of the hot spot to the Coggeshall Street Bridge is almost twice as far away. So it would be more time for the material to drop out. We're still talking about the dredging the same kinds of bottom materials out.

Our belief is that if we were to dredge the hot spot, use the decision criteria, which is no significant increase, environmentally significant increase in background, as an operating parameter, that we would be safe. And that if there were some measurable increase, then we would have to increase our controls, which would be dredging during different tides, slowing down the dredges, putting in additional controls on the dredges.

At this point in time we don't feel that warrants any significant hydraulic controls. That may create other problems, vis a vis blocking up controls that require to be operated when you have storm flows, and that kind of stuff.

MR. HAYDOCK: Your original pilot study was in a cove out at perhaps the main flow of the stream, or the main channel. So you have a little more flow than when it was way off to the side, as the way it was in the cove.

MR. CIAUITIERI: I think what we found, George, in the study was that the PCB concentrations dissipated at a very short distance away from the dredge. So there is no reason to believe whether you're in the middle of the channel, or the edge of the channel, that will change. And we don't really have any reason to believe that it will get all the way from the hot spot to the Coggeshall Street Bridge, when it didn't get from where we were to the Coggeshall Street Bridge on the same operations.

And in that point in time, quite frankly, we were learning how to do the dredging. And we now we know much better, as Mark has indicated, much better controls, and have even more confidence that we can do this without causing any major---

MR. OTIS: The hydrodynamic conditions in the hot spot, under normal conditions, non-storm events, non high flow events, aren't that much different than the cove anyway.

MR. CIAUITIERI: I think you should recognize that some of the PCBs that go out in the estuary go out in a soluble form, and that any activity in the upper estuary, whether it's capping, dredging or what, may cause some small increase. I think you have to expect there will be some small pain to get the gain that's necessary to clean up the harbor.

There is no way anybody can do anything with those PCBs without causing some disruption. But we believe, and I think that the boys in the capping, believe that those things could be controlled.

MR. HAYDOCK: Then one of the other things that I'm sure you've heard again and again, but I haven't heard any recent information on answers to this. We were disturbed about the disposal of metals. And again and again, and particularly where there was very little to indicate that you were going to be able to, under the present methods of putting it into a solid state, and controlling lead or maybe cadmium, or one or two of the other heavy metals that were so significant in the upper estuary.

MR. CIAUITIERI: I'm going to ask Doug, or one of his people, to give me a little help on the metals.

I think, just to recap where we were on the metals, we have indicated to you that the proposal and the pricing that we gave you includes fixation of the metals. The procedure will be to do a test burn of the material. Take the ash, run it through it through the detox test, make sure that it doesn't leach. If it does leach, if the metals are not fixed, and do not stay in the ash when you run water when we do this test, then we would go into the fixation process, and determine whether the metals can be fixed.

Now we believe that the metals can be fixed, and I think Doug or Guy here will give us confirmation. Lydia, did we not send you some information? There has been some information given to some of the people on the committee at least, regarding some literature and some articles about fixation of incinerated ash.

Barring all that, if for some reason the metals couldn't be fixed, we've indicated that the ash will be taken off site and disposed.

And so I think what we're saying ultimately is we'll either have a fixed ash where the metals won't leach, or we'll take the stuff off site.

I understand some of the concern that's raised about the fixation of metals deals with the fact that some of the information done by the Corps of Engineers was in the experiment stage in their studies, and indicated that they didn't fix all the metals when they did their test.

I've tried to explain to people that those tests were limited in their scope. We did not ask them to go to the end result, but would find some solution that will fix all the metals. They probably could have if we'd asked them to. But at that time we were not that far along in the project. We were only worried about the pilot study.

So, secondly, the kind of material that they were trying to fix the metals on was just dredged material from the bottom, it was not incinerator ash. So we're talking about trying to fix metals in a totally different medium, a dredged sediment versus an incinerated ash.

So let me ask Doug, or Guy to tell you a little bit more of what we can about the fixing of metals.

MR. HATHAWAY: My name is Roger Hathaway. I'm with E.G. Jordan.

I think Frank has hit most of the high points. Primarily, just to recap a couple of things that he said, once again the tests that the Corps had done were primarily to see whether or not PCBs could be fixed. And in sediments that were tested by the Corps there was fairly high oil and grease content, and boiling grease is a measure of the organic matter in the sediments. And that matter tends not to fix very well. It's much trickier to fix than a dry matrix.

For that reason, the fact that certain things were mobilized out of that material once it was fixed, is not of particular surprise. There are a lot of people trying to work on fixing organics right now.

The fixation of inorganics though has been fairly well demonstrated, both for soils or sediments that have been de-watered, and contain inorganics only, or for ash. One of the areas where there's been a lot of work done with ash is on municipal waste ash. When you burn municipal waste in an incinerator you tend to generate an ash with a lot of the same metals that we're looking at in the harbor, metals like lead and cadmium and copper and zinc. Those tend to be fairly leachable in the ash, and so there are people looking at fixing that into a block or a stabilized matrix, so that the metals will not leach.

And one of the papers that we sent to Lydia, that's available to you, and we can certainly get other copies, discusses particularly the idea of taking incineration residue and fixing it, and putting these blocks out in the marine environment.

And there's a gentleman with the State University of New York at Stoneybrook, who has done this, and built an artificial reef off of Long Island. And he found that within a very short time the animals repopulated this area. And then after taking samples of the flora and fauna that had grown onto this residue that was fixed, and analyzing those samples, he found no detectable levels in the organic materials of the animals and plants that had grown on this residue.

So there have been studies not only done on the fixation of the metals, but specifically how that fixed matrix works in an ocean environment, and they've all shown that the metals can be successfully fixed.

We, as a result of some of the questions that came up during the last public meeting, we did go back and review our files, and collected some information, and sent that on to members of the committee here. And certainly, if there are any specific other questions that I can answer, I'd be more than happy to answer questions on the whole fixation question, because I realize that's a concern.

MR. CIAUITIERI: I have another comment. None of the alternatives being proposed destroys the metal. I think everybody understands that. It's just where they are in the environment, and what state they are in the environment.

And in one proposal they are fixed in a concrete matrix, stored in a cell a significant distance from the water on a temporary basis until we decide what to do with them permanently, which could be permanent. I'm not trying to hide that from you, but it's possible that we would put them in that solid and leave them there, if that's the environmentally safe to do that.

The other alternative, the capping alternative, proposes to do nothing with the metals but cover. They don't go away in either alternative.

MR. HAYDOCK: One final question then on incineration. I gather that the incineration of PCBs has been shown, when it's done in a pure state, to be fairly complete, heat is brought up to the proper level, and apparently, if done properly, and if the gas is properly burned off, you don't have any particular residue.

But you're burning the sediment here which is containing a lot of other organics, and also metals. And in this process do you break these other elements down enough so that you have some problems with other contaminates other than you would with pure PCBs? And right now incineration isn't a very popular method in the area, because it's possible effect on acid rain and all of these things. In your emission, what is the output of small particles and other chemicals? Do you know?

MR. HATHAWAY: Once again, Roger Hathaway from E.C. Jordan. In answer to the question, the PCBs definitely have been incinerated in a relatively pure state. They have also been incinerated in all different types and forms of contamination, because EPA has been dealing with this problem for several years now.

Incineration is the preferred alternative for destroying PCBs, and that's the way it's written into the regulations. And millions of pounds of waste-containing PCBs are incinerated every year by commercial incinerators throughout the country. There are about five of them that operate, and really burn million pounds a year of all types of materials containing PCBs.

In addition, mobile incinerators, similar to the ones that have been proposed, had been demonstrated at a number of sites for destroying PCBs in soils and in sludges.

As far as what comes out, EPA has set guidelines in the regulations as to what the allowable limits of emissions are. And, first of all, they require that 99.999, or six nines, that percentage of the PCBs be destroyed.

And at the last public meeting we were looking at the number or the amount of PCBs that would be emitted as a result of that, and for the entire hot spot clean up we came up with a number on the order of six and a half ounces of PCBs emitted during the entire burning schedule.

That was out of 500,000 lbs of PCBs that were fed to the incinerator. So it was a very small proportion that was let out, as you might imagine from the 99.999999 number.

Tests on incinerators have also shown that the total of other organics that might have some negative impact on the environment, would not exceed the amount of PCBs that are being let out. So they would not exceed that six ounces either. It's very small proportions. And that, once again, is due to the fact that you're operating in a very controlled environment, with very high temperatures, and with residence times.

In addition, for particulate matter, EPA has put a stringent limit on particulates which may be released, and also on acid gases which may be released. And before the incinerator is allowed to operate at the site, they have to demonstrate, the operators of the incinerator have to demonstrate, through a trial burn, that they are able to meet the acid control limitations placed by EPA, as well as the particulate limitations. And all that has to be shown up front before the incinerator is ever allowed to operate. That's all part of the permit condition or the demonstration condition in this case.

THE CHAIRMAN: Thank you. Frank? Frank, come up.

MR. ANASTASI: Just a couple I think.

My name is Frank Anastasi. I'm a hydro-geologist with Environ Corporation, acting as the technical advisor for the community work group.

And I'd like to follow up on a couple of areas of questions, while we're on the recent topics of the hydraulics of the dredging, and also the incinerator emissions, and the ultimate fate of the incinerator ash.

First of all, I guess, Frank, I'll direct the question to you, and then you can direct it accordingly. The PRPs mention an air photo that showed a plume of resuspended sediments during the dredging operation. And I wonder if you know, or if any of the people associated with the pilot study know, of the origin of this plume?

MR. CIAUITIERI: I'm not aware of those photographs.

MR. OTIS: I haven't seen the photo.

MR. ANASTASI: Are you aware they've made this allegation? Okay, well, it's in the PRP proposal, and we can talk about that later.

But I had a question of whether that might have been associated with your installation of the silt curtain, when you were testing that. I think there was mention in the feasibility study that deploying the silt curtain actually caused more turbulence than was observed by the dredging operation. And I was just going to look into that, to see if that might be the explanation of that.

MR. OTIS: Mark Otis from the Corps of Engineers again. Yes, it could have been. There were numerous events during the pilot study phase that caused, I'm sure, plumes of suspended sediment. During the dike construction phase, for instance. Also while a lot of the dredging was going on they were putting in stone protection along the face of the dike. That activity also created a lot of resuspended sediment.

The silt curtains were definitely a problem, both installation and also their movement from wind currents and the like while they were in place. We also had, on numerous days, especially at the start of the operation, we had problems with the swing anchors on the dredgers. These anchors are set out on either side of the dredge, and the dredge pulls off these anchors. We had problems holding those anchors in place. They shifted, tended to rip through the sediment, causing large plumes of resuspended sediment.

You know, we solved those problems by putting those on land, but depending on the day you took the photo, you certainly could have seen a rather impressive plume.

MR. ANASTASI: Do you recall the maximum downstream extent of the kind of observable sediment plume?

MR. OTIS: We had an array of sampling stations basically between the entrance to the cove and where the dredging operation was going on. The outermost set of stations was probably inside of 500 feet from the point of dredging.

The background levels in the cove were probably in the ten parts per million range for suspended sediment. I think the highest level we picked up at one of our plume stations was probably in the order of 30 or 40 parts per million. Generally by that last row of stations we were back around ten.

MR. ANASTASI: Okay.

MR. OTIS: During that confined aquatic disposal, we were discharging the material in that cell inside the cove. We had elevated levels as compared to the previous phases of the study. At that point we probably did have a plume of material that was getting beyond that last array of stations. It was probably in the 30 or 40 part per million range. However, that was not detected at the Coggeshall Street Bridge, which would have been our next point.

MR. ANASTASI: How distant would that bridge be?

MR. OTIS: The bridge is probably 1,500.

MR. ANASTASI: So in the CDF and the pilot study, in that type of work, you're saying that 500 feet downstream your background conditions, and three times that distance is the Coggeshall Bridge, which serves as the limit of the upper estuary for purposes of this study?

MR. OTIS: Yes.

MR. ANASTASI: Okay. Since you're here, Mark, I just wanted to ask you if you could get more specific about the similarity of the hydraulic regime of the cove and the hot spot area, because both the PRPs have planned that out. Everyone has been concerned about resuspension, and I have physically seen both spots. And after today I've got a good picture in my mind of what it looks like. And I wonder if you could give me some more technical?

MR. OTIS: The water depths in the cove, for instance, were about half of six inches at low water tide range, about four and a half or five feet at max. Of course, there is no input of water into the cove. There are only currents, or surface currents, from the wind, and then the movement of that water out of the cove on the tide.

Up in the hot spot area you have similar water depths. Of course, you have the river coming in with an average of 30 CFS flow. The hot spot areas are somewhat removed from the mid channel portion of the flow. The measured currents measured in the cove are .3/.4 feet per second during the pilot study. They're higher in the hot spot. But for the purposes of affecting the dredging operation significantly from the work that people at West did, in doing modeling, they took measurements of currents throughout the upper estuary and did some modeling, so they could estimate the movement of the cameras in resuspended sediment.

MR. ANASTASI: Do you have any estimates that you'd want to share with us tonight?

MR. OTIS: I don't have the numbers off the top of my head.

MR. ANASTASI: Do you think they're on the order of a thousand feet?

MR. OTIS: I wouldn't anticipate that the dredging operation in the hot spot would be dramatically different than the pilot study.

MR. ANASTASI: Okay, somewhere in there, you expect that 500 feet downstream---

MR. OTIS: You'd be approaching background.

MR. ANASTASI: ...you'd be looking at background again? And would that bring you as far down as the CDF?

MR. OTIS: No, it wouldn't. It would still be above the cove.

MR. ANASTASI: Is this part of the estuary a positional location, as the PRP proposal points out?

MR. OTIS: The hot spot area?

MR. ANASTASI: Right.

MR. OTIS: Yes. The hot spot area, from the information I've seen, doesn't appear to be an area that is eroding, based on the material that's there.

MR. ANASTASI: And since you're the engineer from the Corps of Engineers, do you have any comments on the geotechnical concerns associated with placement of the cap, such as the PRPs are proposing, in terms of settlement? You mentioned you had problems with your dredge anchors, and I've read that there are up to 17 feet thick layers of plastic sediments.

MR. OTIS: I'm not a geotechnical engineer, but from what I've known about the work in New Bedford, the area where you built the CDF dike was obviously a very soft area, just from the fact that they were using the geotech style in the construction methods used.

I don't believe that the hot spot -- it's probably dramatically worse than that.

We put a 15 foot lift of fill on top of where the CDF is. We're talking much less of a cap placed on the hot spot area. It's going to be hydraulically placed, as opposed to being placed with equipment. So I wouldn't anticipate that you'd have serious settlement problems up there with placing a cap.

MR. ANASTASI: Okay. Frank, let me ask you about the issue of the metals. In the original draft of the feasibility study it was really termed disposal of the incinerated sediments. And in the subsequent draft you came to the point of talking about temporary storage, waiting to look into the options. And I believe the wording was changed.

Was there any consideration given to, especially now, and that you've come to the point of looking at something more temporary, something like creating a lined pond, and just a staging area, to maybe save expense of actually burying them with the possibility of digging them up later. Has that been looked at? Do you anticipate looking at that if you are going to keep this disposal the ultimate fate of the incinerated sediments open, at least to do some further analysis?

MR. CIAUITIERI: We hadn't looked at that, that kind of interim disposal process. We called it disposal, to get into a little bit of wordsmanship, only because the original arrangement we made with the city, and with the state, when we got the concurrence to do the pilot dredging and disposal study, was that the ultimate disposal of that CDF was going to be decided when we made the overall harbor clean up remedy, and not until then.

So when we looked at the land, which in the draft was the disposal, it sort of precluded what we were going to do with the CDF, and that was not our arrangement. That was not the understanding we had, at least with the city.

So no matter what we worked out down there, our arrangement with the city is that what will happen to the CDF will be the subject of one of the decisions to be made for the overall harbor clean up. So that's the reason why we went from disposal to temporary.

In terms of whether we could come up with some other way to handle that in an interim way, we welcome some suggestions on how to do that. But I guess what goes through my mind, to be very honest with you, is that it will be probably a couple of years before any more discussion would be underway after this phase this time, and given the process we have.

If the material is incinerated and fixed to the standards that we require it to be, it could be stored right on top of the ground and still be safe. It is no longer hazardous waste. And the reason we're going to bury it is because we suspected that people would not like to look at that, and it would be a lot easier to put it in blocks and cover it, and then go back later and dig it up if we have to.

But if not, it's not a hazardous waste, and if we left it there it would be properly disposed of. So there would be no need to go back.

If we put in a temporary thing, and then later conclude that that's not the ultimate remedy, that what we should have done was bury it, we've got to go back at it again. So I don't know if anybody, at this point in time, could come up with the ultimate disposition, other than taking it off site to an approved landfill someplace else. But this is one of the options we talked about. It does increase the cost because you have to ship it someplace. It shouldn't be a problem to dispose of, especially if it's fixed, because it's a non-hazardous waste.

Then the question comes up, why bother to fix it if you're going to ship it off site, and have to go through that kind of mechanics.

But for the moment the plan, barring anybody convincing us to do something different, would be to fix it and cover it so it's not there to look at every day.

MR. ANASTASI: We heard E.C. Jordan talk about some recent case histories of fixing metals and putting them back into the environment. But I was just going to inquire of the time frame of this monitoring after this was done? How long of a post placement monitoring period, if you recall?

MR. CIAUITIERI: Roger, do you know the answer to that?

MR. ANASTASI: Because that's one of the criticisms or one of the concerns that people often raise, is we don't feel we've got a long history or track record that shows successful fixation.

MR. HATHAWAY: This fixation has been monitored over a two year period.

MR. ANASTASI: Two year?

MR. HATHAWAY: Primarily the monitoring they've been conducting is sampling of the flora and fauna that's living on the residue itself. They've also done some monitoring in the water around the residue.

One of the important things to remember about this residue, when it's in the marine environment, is that typically when EPA does a leaching test to see whether or not metals will be made available, or will be hazardous to the environment, they take water and acid, and they leach the residue with water and acid to leach the metals out.

That's a fairly rigorous method. What we're actually proposing to do here, or what's being done here, is where they're putting the waste back into the marine environment, is to put it back into an area which is less harsh than the leaching procedure that EPA typically uses to try to determine how much metal will come out of a matrix.

So the tests that EPA would be using, to determine whether or not this residue could be put back, would be fairly conservative compared to what you would expect in the environment.

MR. ANASTASI: That's an important point that a lot of people may not have been aware of. Actually, you acidify it down to a PH of 2 or 3?

MR. HATHAWAY: No, five.

MR. ANASTASI: And natural PH is in the range of seven or eight?

MR. HATHAWAY: The PH in the ocean is about 8.2

MR. ANASTASI: Okay.

MR. HATHAWAY: And the ocean has a relatively infinite buffering capacity, so it's not going to change.

THE CHAIRMAN: I think Doug wants to answer a portion of that for you too.

MR. ALLEN: Doug Allen, E.C. Jordan. One point of clarification on the disposal of the incinerator residue with the metals is that it would be deposited in the secondary cell of the CDF, which is not in, shall we say, an open conduit to the harbor. In fact, it is upland from that. It is built on existing topography, so there isn't a hydraulic conduit if you will for any potential leaching of metals to readily get back into the marine environment.

That was one of the considerations we had when we looked at disposal, that it would be, relatively speaking, a safe place to dispose of it. Isolated from the environment, and therefore, would tend to be more stable.

MR. ANASTASI: There was one other question, Frank, I was going to ask, and it just slipped my mind. I'll reserve my right to maybe catch you after the meeting.

MR. CIAUITIERI: I'll be here. Sure.

THE CHAIRMAN: I've got a couple. I've seen that a couple of people on here had some of the same thoughts in mind.

Regarding when the dredging is taking place in the hot spot, it was related to you that you have floating plume that runs from the dredge to the CDF. One of the questions that was raised is what happens if there's a break in the pipe? Does anybody know how long it takes to shut that down, and how many cubic feet would be, you know, dispersed into the estuary, if something like that did happen?

MR. VAILLENCOURT: My name is Guy Vaillencourt. I'm with E.C. Jordan.

When we did the feasibility study we costed it in a crew of people to drive up and down about this, about 4,000 or 5,000 feet in a boat, checking the pipeline continuously during dredging. And if there was a break these people would be in immediate radio contact with the dredge, and would shut it off.

In talking with the Corps of Engineers about the possibility of a break, we all feel that during dredging it will be pretty minimal.

You need to understand that we're not talking about dredging 24 hours a day. You need to understand that we're talking about dredging with the incoming tide, so a lot of the hydraulic questions that were answered earlier, were not talking as the tide is going out, and the river is moving out, we're only talking about the incoming tide.

So we have a very short period of time that the dredging will actually be taking place. We will have a crew in a boat along the pipeline checking it. And, of course, during non-dredging time it will all be maintained and checked.

So if there were a break, it would be as quick as the crew could call and tell the dredge. But our feeling is there would be plenty of time to maintain and check it while it was going on.

THE CHAIRMAN: The floating plume that runs from the hot spot area to the CDF, will that run in the CDF in about the same place as it did before?

MR. VAILLENCOURT: I don't know.

THE CHAIRMAN: Where the pipe is running through the wall now?

MR. OTIS: It could. It wouldn't really matter. It's a matter of configuration of the site, how you set it up.

THE CHAIRMAN: Right. Because it was convenient in the cove to run it in there.

And the second question I have. I know Frank and others have explained about the incinerator, but I've had questions from basically the general public, mentioned about the monitoring, the test burns, the automatic shut-offs, etc. But I need a little more as far as monitoring. It does monitor the gases that are in the stack, as they're being cooled off and so on?

MR. HATHAWAY: Roger Hathaway from E.C. Jordan. I think I can answer. Typically in an incinerator what they monitor is in the stack itself, there are a variety of things monitored. CO2 and oxygen, which gives you a feel for how much excess oxygen is coming in at the beginning, because you want to make sure you have enough excess oxygen to oxidize all the organics and destroy them all the way to CO2 and HCO and H2O, which is the point of it.

So you have to maintain oxygen at at least six percent in the stacks, so there's been enough excess to do that. Any time it goes to below three percent you have an automatic shut off.

The other major thing that's monitored is carbon monoxide. Carbon monoxide, as you might be aware from your car or anything else, when you have a poor burn you tend to generate some carbon monoxide. And hazardous waste incinerators are operated at a very efficient burn. And one of the requirements of the PCB incinerators is that it have what is called 99.9 percent combustion efficiency. And that means that when carbon in the PCB molecules, or in any organics, gets burned, that 99.9 percent of it goes to CO2, which is carbon dioxide, versus CO, which is carbon monoxide. Because Co is an indicator of poor combustion.

Any time you drop below that point, or your combustion efficiency drops below that point, then the incinerator automatically shuts off. And that's the other automatic shut off.

The purpose for using the CO is it's a readily monitorable gas, whereas monitoring something like PCBs is not readily monitorable.

The other thing that's monitored is what is called total hydrocarbons, which is the light hydrocarbon amount of what's in the gas. And once again that includes light, single or double carbon compounds like methane or ethane. And that again is another indicator of combustion efficiency, because a good combustor will operate with very low THC levels. And that again is monitored continuously, and an be attached to an automatic shut off, but is not required to be done that way in the regulations.

THE CHAIRMAN: I understand what we were told before is this incinerator would have all the automatic shut offs and that, if I remember right.

MR. HATHAWAY: I'm sorry if I wasn't clear. It's only the total hydrocarbons that are required to be attached to a shut off. Everything else is required under the permit conditions.

THE CHAIRMAN: And does it take very long for the -- I imagine part of the incinerator must have to go through a process to cool down.

MR. HATHAWAY: Yes.

THE CHAIRMAN: But as far as the loading, that ceases?

MR. HATHAWAY: That's what shuts off. In addition, any time any major equipment like the fan that's drawing the air into the incinerator, or any other piece of major equipment malfunctions, then that feed has to stop automatically.

You really don't want the rest of the incinerator to cool down automatically, because you've got some stuff in there. So the rest of the incinerator continues to operate in a shut down and stepwise fashion, maintaining the high temperatures.

THE CHAIRMAN: So as everything has gone through the process, it would just decrease and shut down?

MR. HATHAWAY: It actually takes a few hours to cool down the burning chambers of the incinerator, because they're heated to such a high heat.

THE CHAIRMAN: What temperature does that run at?

MR. HATHAWAY: Typically there are two chambers. One is where the soil is, and it's being treated. And the second is where the gases go through. The area where the soil is heated is in the range of 1,800 to 2,000 degrees fahrenheit.

The area downstream, the after burner it's called, which is heated to at least 2,400 degrees fahrenheit, and that, once again, is the number that's required by the regulations. And the gases must stay in that 2,400 degree fahrenheit box for at least a second and a half, to achieve a complete burn.

THE CHAIRMAN: Thank you. Yes?

MR. ANASTASI: My memory was jogged. This is Frank Anastasi. I want to just follow up on the emissions from the incinerator. You haven't mentioned any other parameters, and one metal of concern in the sediments is lead. It is a relatively low volatilization temperature, and can be troublesome in emissions I understand, partially because of its affinity for absorption on fine particulates. Do you anticipate doing any kind of monitoring for lead, or have you looked at this, and determined that the quantities are insufficient to be of concern?

MR. HATHAWAY: Doug, you want the question on lead for emissions? Do you anticipate monitoring for lead?

As far as I know, during the trial burn, the particulates will be analyzed.

MR. ANASTASI: I'm thinking in gaseous form also.

MR. HATHAWAY: Right. The way a particulate train does, and I apologize for that phrase. It's a little bit misleading. A particulate train actually takes a sample of the gas, it runs it through what is called an impinger, which is like a glass of water. It runs that gas through the water, and cools the gas. And by doing that the lead would come out of vapor phase and go into the impinger.

In addition, the particulates are trapped on a filter in that, so you can measure for both vapor phase and solid phase lead on an impinger, using an impinger train. And that will be used during the sampling during the trial burn, both for measuring metals and particulate, as well as for measuring PCBs. You use the same type of train for both of those.

As far as whether the EPA intends to require any specific levels of treatment for lead, I am not quite sure.

MR. ANASTASI: Any of the emissions control geared towards keeping down lead?

MR. HATHAWAY: Typically what is done, because hazardous waste incinerators frequently are operated with metals, that they are, in fact, emission controls are designed to knock out metals. And the way that is done is generally a two step process. One is you want to get the lead out of the vapor phase, and the other is you want to get it out of the particulate phase.

To get it out of the vapor phase, what happens is when the top gases come out of the incinerator they are put into basically a big box with water coming down through it, which is called a quench, and it cools the gas down. By cooling the gas down lead, which vaporizes, I'm not sure, somewhere in the range of 600 to 900 degrees fahrenheit, if you cool the gas down below that level then the lead will come out of vapor form and go onto the particulate.

So the first thing you do is you run it through this quench, which cools the gas, and causes the lead to settle onto the particulate. And then what you do is take the gas and run it through a particulate control device, which is either an electrostatic precipitator or bag house. A bag house basically acts as a big filters, and it filters out the particulate matter.

The electrostatic precipitator acts by basically applying an electric charge for the particulate, which takes on a negative charge, and then passing that particulate through two positively charged plates, and the particulates are attracted over the plates, and falls down out of the gas. And that's called an electrostatic precipitator.

Those are the two primary methods for controlling particulate incinerators. In general, they can remove between 95 and 99 percent of the particulates fairly successfully.

MR. ANASTASI: Thanks very much.

MS. VON HIME: Do we have any more questions? Thanks very much, Frank, Doug and Don and Mark.

Do you want to identify yourselves?

THE CHAIRMAN: We need your names.

MR. SERAPAS: Leonard Serapas with Balsam.

MR. BOSWORTH: My name is Weldon Bosworth, Boston Environmental Consultants.

MS. VON HIME: George or Donald?

THE CHAIRMAN: Go ahead, George.

MR. HAYDOCK: I'm George Haydock, with the community group.

In your discussion of bio-degradation of the PCBs, you differentiated somewhat between aerobic and anaerobic degradation. And it wasn't clear to me, is anaerobic a much slower process than aerobic? What I read a little bit about this is if you add it up should you speed up the biodegradation process? Therefore, it seemed to me that perhaps the anaerobic where they had to break the bond between the two components, would probably be a much slower business.

And one of the things that you are doing is, when you put your plastic over the top, when you are covering everything, is you are producing an anaerobic condition down below, and therefore, it would seem to me that you are going to get a much slower biodegradation than perhaps was implied when you do it just on an aerobic set up.

MR. SERAPAS: We believe that primarily anaerobic degradation is currently occurring in the harbor sediments, that there is little evidence of aerobic degradation in the sediments, based on the chromatograms that we've reviewed.

To answer your question though, yes, in general anaerobic processes are slower than aerobic in relative sense. Waste water treatment, for example, aerobic degradation of a carbon waste is much quicker than an anaerobic degradation. But we believe that an anaerobic process is occurring.

One of the, I guess, reasons that anaerobic processes seemed to be occurring in the sediments, is that the anaerobes are more aggressive microbes. That the higher chlorinated compounds have been resistent to aerobic degradation, and so it's the anaerobes that have the capability to remove a chlorine from a PCB.

You commented that by capping we would be making the sediments, that we would be making them anaerobic. Well, we've done profiling of upper estuary sediments, and we profiled the reduction oxidation potential of the sediments, or as it's termed, redox, and deeper than maybe three to five centimeters those sediments in the upper estuary are all already oxygen deficient or anaerobic, with the exception of those beach sediments along the eastern shore line in the salt marsh.

So we wouldn't be changing the conditions under which the anaerobic degradation is already occurring. In fact, we might be removing where there's a little bit of exchange of water in some of the pores of the sediment, we might be removing that oxygen layer, the oxygen transfer, and enhancing the process.

MR. HAYDOCK: But does that change your predictability, therefore, on the length of time? It's not clear to anyone how long you could expect biodegradation to take. This is, to me, the most difficult part of evaluate, particularly when you have such high concentrations of PCBs in the hot spots.

MR. SERAPAS: You're right. The rate is the most difficult piece, that is the piece that we are working on right now. We are not going to have the complete numbers for you, but we are shooting for October 1st. We have made some progress. There was a recently released report by the EPA, Environmental Research Laboratory, in their Narragansett lab, and in regards to this concern about the hot spot, and this is a quote, this says: "The most extensively altered PCB distribution was found in the six to seven inch deep section of the core from nearest the plant's outfall." Which is where the highest concentrations are.

And I believe this was transmitted to you. They do have similar rates of degradation as the rates that Brown predicted.

So that we have all the rates resolved, I would have to say no, but we do have some ideas about how fast certain PCB congeners are degrading. Some of them are very quick, a matter of half lives of five years, others in this report were predicted to be in the hundreds of years. But this report goes on to say, and rather than quote it, it says: "In this author's opinion, the more toxic isomers of PCBs", and they reference a relatively recent reference -- I haven't really studied all of these. I think we've all been inundated with paper.

This is a 1988 reference by Cannon and Tannerby. It's the toxic potential of non-ortho and mono-ortho coplaner PCBs and commercial PCB preparations. On that basis, a relatively recent reference. This author believes that the more toxic PCBs were some of the first to be degraded.

MR. HAYDOCK: There was one other area that concerned me a little bit, and it related to, again, your criticism was there had been no study of dredging in a high concentration area. And we've got exactly the same thing, as far as laying down a cap over this area. No one has had experience of capping an area where the PCBs have been this high.

MR. SERAPAS: There have been some experiences, some more recent cites that we are going to be discussing in our next work product, some sites in Japan. I don't know, Weldon, if you recall the concentrations that were capped there. But I know one of the sites was capped with a comparable thickness of sediment.

Do you recall the concentrations at the Japanese sites?

MR. BOSWORTH: I don't. The only one I remember was in Boston. It was up around 50. That's the only number I recall of capping. Around 50 I believe.

MR. HAYDOCK: So not very high?

MR. BOSWORTH: No, not as high as what we're seeing here.

MR. SERAPAS: In response to your question, that will be discussed in the remaining section of the report is why the function of the cap works equally as well for varying concentrations. And the reason is that the transport of PCBs through the cap is controlled by molecular diffusion, which is a very slow process. The reason that the cap will contain these constituents is that they are relatively insoluble.

The pour water in the cap can only contain so much

PCBs. The solubility of the PCBs is less than a hundred parts per billion. Once that pour water becomes saturated no more PCB can get into the pour water.

The equations that we performed indicate that once you get above a sediment concentration of around 300 parts per million, you reach a saturation in the pour water. So above 300 parts per million, that sediment can not put any more PCB into solution, into the pour water. And that molecular diffusion process works at this rate, when it carries the PCB molecules in all directions.

MR. BOSWORTH: Even though you correctly point out that there is the unknown of having either dredged or capped contaminated sediments of that concentration, our concern is that where you really run the risk of the unknown is through disturbing them. If you're laying a cap over them, you're minimizing the disturbance. If you're actually physically moving them, then you run the risk of volatilization, suspended particulate matter, and even the resolublization of that which is not at a saturated level in the pour waters.

So whereas we learned earlier, you saw or measured concentrations of 30 to 40 parts per million in the near field, as I understand Mark Otis talking about, this is in dredging in concentrations of what really average out to be less than a hundred parts per million, once you look at the total mass there.

If you then scale up, as was mentioned, you really expect the difference or the ratio between the hundred and the 10,000 to be matched by the near field concentration of the PCBs in the water column.

I'm not trying to say that's what he meant by scaling up, but you see we feel this is where the unknown is. You can't predict that. If you end up with 30 or 40 parts per million in the near field, and as we see, as Mark was saying, you cannot measure those at the Coggeshall Street Bridge, well, then you have to ask the question "where did they go?" Now they either went someplace through dilution or volatilization, or your sampling design was inaccurate to measure them. So it's still an unresolved question.

MR. HAYDOCK: Just one other question then that came up in our discussion the other day, which was one of the concerns of some members of the group was that you could fracture the seal if you were eeling, if you were out dragging for clams, or whatever it is. And when you get a fracture like this, are they self-healing, or do you have to go and re-patch, or what happens?

MR. BOSWORTH: We talked about a number of things that might potentially destroy the cap, or move the cap. And one of those is a boat going through, a propeller. I don't think you're going to be dragging for clams up there. You don't have the types of clams one drags for generally up there, particularly in that shallow water.

Let me put it this way, the geo-fabric itself is not self-healing. If you actually tore it, which would be a heck of a job to do, it would not heal by itself. But the depressions or scars in the bottom that would be made through human activity would fill in a tidal cycle or two, just through something, and/or sedimentation, as you know from having dug at the beach, that these things fill in relatively rapidly.

So that portion of it, we use the term self-healing. It will eventually get filled in, in a fairly short time.

MR. HAYDOCK: I guess that's all I have. Thank you.

MS. VON HIME: Anyone else?

THE CHAIRMAN: I've got one I'd like to follow up on. Leon Chadwick. I know George touched on it briefly, and unfortunately one of the members is not here.

But I believe he was concerned with people who were not supposed to be there, dealing mainly with poachers and other things. Because, in his opinion, if this technology takes place, he had mentioned that oysters and other things would naturally flock to this new environment. And dealing with various rakes, or even various types of tongs and small dredgers, that were quite heavy, that did have some substantial teeth that run anywhere from two to about six inches, that are actually worked into the ground.

So if you happen to be working in basically a sandy area, that six inches can be worked depending on who is on the other end of the equipment. It can be worked into ten, twelve, or fourteen inches. Whereas, if you're running into some rock, or something else, you'd be lucky if you got the two inches.

And, as we're well aware of now, the signs have been posted there for a long time about no fishing, no swimming, in three different languages. They still chase people out of there.

MR. SERAPAS: We expect people to be in the upper estuary following remediation. Weldon could comment more on the types of species that one would expect to recolonize the upper estuary following remediation. But we expect that area to be recolonized and to be healthy, and that shell-fishing to occur in the upper estuary, assuming the sewage pollution problem is mitigated also.

In our assessment in clamming or digging, digging holes, our opinion is that in part, because of the material we've chosen, which is a sand, those disturbances are going to be self-healing. That sand has a tendency to be self-leveling. So we did think about that. I think most of the people in this room have spent time digging for clams or quahogs. And if you go out into the same sandy flats a day or so later, they're pretty level. And that material essentially fills the hole back in.

MR. BOSWORTH: Let me answer your question further. First of all, it's my belief that the species which would be most often hunted or dug after in the upper estuary following remediation would be the soft shelled clam, the steamer, you know it by several names. That's one that would live in that type of sediment environment. It would likely dig down 20 centimeters or so, perhaps a little more in some of the larger ones. I think generally in that environment it would be around 20 centimeters more or less, roughly not quite a foot.

The people that would be digging after them obviously have a need to get as many of them as they can. Once they reach the geo-fabric, obviously no clam is going to be below that because they wouldn't be able to burrow through it, even if they were put right on it.

And, number two, if one were to stick their clam fork into it, it would catch. It would negatively reinforce digging any deeper.

Now I admit it's a man-made fabric that's down there, so you lose a little of the aesthetics of digging for the clams. But from a practical and reasonable standpoint, no one would have the incentive to continually re-puncture with a clam form that geo-fabric, I don't think. The clams would be up above it, substantially up above it for the most part. And there would be no reward for going deeper.

MS. VON HIME: My name is Lydia Van Hime. I'm clerk of this working group. Len, you said that essentially if the fabric is pierced the fabric itself does not self heal, it will fill in with sand and sediments? Is that correct?

MR. SERAPAS: Weldon talks a lot about puncturing---

MS. VON HIME: Okay, that's not the point. Your statement that diffusion, molecular diffusion, is a primary process of movement, and obviously pour water cannot diffuse upward through that fabric, but it can go through the sediments and sands that would fill in a tear?

MR. SERAPAS: Yes, they go through whatever is there. They are diffusing through the cap. We've assumed, in essence, that we have a twenty centimeter bioturbation layer, which is where the majority of the biota will be living in that cap. That probably is where the majority of the clamming will occur too. Some will go deeper. But I think Weldon's point is that the clams don't live there, the shellfish don't live there, there is not a lot of incentive to dig deeper.

MS. VON HIME: But my concern is not whether somebody is out there poaching clams. My concern is strictly the fact that one of the ways this fabric works is to prevent the molecular diffusion of PCBs in pour water upwards.

MR. SERAPAS: No, it doesn't. It has one primary purpose during construction, and one primary purpose after construction. The primary purpose during construction is to minimize resuspension of contaminated sediments, and prevent them from mixing in the clean cap material.

The purpose after construction is to provide an additional physical barrier for humans to get down into the contaminated sediments. The fabric does nothing to prevent molecular diffusion. It does nothing at all. That's basically what that twenty centimeters of undisturbed sand does. It provides a zone for that diffusion process to occur. Our current breakthrough times are about a thousand plus years.

Whether the hole fills in with silts or with sands has little bearing on that process.

MS. VON HIME: Thank you.

MR. DUMONT: My name is Donald Dumont. I'm a member of the community work group. You just confused me. The bottom of that foot and a half/two foot sand barrier, is it possible to have some PCBs residing down there diffusing through the cap?

MR. SERAPAS: Our model predicts PCB movement. And our model says that PCBs will diffuse up into the cap. They move pretty slowly. To get through about twenty centimeters of the cap it's going to take about a thousand years.

That's what our model predicts.

As they go through the cap they reach an equilibrium with the cap materials, and that concentration is going to be less than a part per million. We were thinking .2 to .3 parts per million.

So yes, there will be PCBs in the pour water, and some of it will absorb out to the particle, but it will take a long time for it to get through, and there won't be that much of it in there.

MR. DUMONT: If the cap was disturbed deep enough, and it did self heal, would that upper material that doesn't have a concentration, is it possible for it to get stirred below, and that would be, you know, it wouldn't be as much in the solution, therefore, it could take on more PCBs?

MR. SERAPAS: Yes, but never more than what the saturation value is.

MR. DUMONT: And that's that one part per million?

MR. SERAPAS: Yes.

MR. DUMONT: With that foot and a half of sand on the cap, how much compression would occur below?

MR. SERAPAS: The estimates of the consolidation are variable, and they're a function of the layer of the silty zone underlying the cap, under which there's firmer material. We're thinking in the range of 18 to 25, maybe 30 centimeters of consolidation will occur.

MR. DUMONT: The life of the geo-fabric, do you feel that's indefinite?

MR. SERAPAS: We've talked to several geo-fabric manufacturers, and I think geo-fabric has been used for only around thirty years. But the principal enemy of a geo-fabric is ozone and ultraviolet light, and it has neither when it's buried.

Their studies, which are only thirty years old, have indicated no decrease in strength, and their opinion is that if you can protect it from ozone and UV light, it will have a very long life.

MR. DUMONT: That's it, thank you.

MS. VON HIME: Any other members of the community work group care to ask questions?

MR. NICKERSON: Howard Nickerson. I'm not looking to be a troublemaker, but I think we ought to stop dreaming that we're going to catch a lot of clams in the area of the Coggeshall Bridge. Regardless of what you do, I think that area is always going to be posted because of other conditions that will probably be prevalent regardless of how good the cap works. And I doubt very much if there are going to be poachers there, even though my colleague says there will be.

And I doubt very much if you will see any clams there. None of us ever saw any before, and I don't expect to see any in the future. So I don't think we're going to see a Garden of Eden, so I don't think we ought to worry about it.

MS. VON HIME: Thanks, Howard.

MR. ANASTASI: Frank Anastasi from Environ again, the technical advisor for the community work group.

I'd like to ask you a couple of questions, first of all. It's almost philosophical. But what is really being proposed is the ultimate long term disposal in situ. And I wonder if you have considered your CPA, and also the State of Massachusetts requirements. Would this be considered hazardous waste landfill? Are there requirements? Have you looked at the regulatory framework? Do you have any idea that this is something that could fly just by the book, regardless of people's perceptions or technical feasibility?

MR. SERAPAS: We are going to be discussing the ARARS for this proposal. This is an in-containment alternative. We believe it's a permanent containment alternative.

What we did at this point in time, in assessing regulatory compliance, is to look at EPA's ARARS assessment. I believe it's task 63. And my reading of that document indicates that -- I don't have it with me, but their evaluation of applicable regulations for CAD would make it allowable under RCRA at this site.

MR. BOSWORTH: Are you familiar with CAD?

MR. ANASTASI: Yes.

MR. SERAPAS: So my reading of that document says under RCRA, under the siting criteria, and I'll leave it for you to read, to reach your own judgment, it would be all right.

CAD is, in essence, the same thing we are doing without the immediate set of flipping the sediments upside down and putting a clean cap on top.

The next set of regulations that we looked at was the TSCA regulations. And let me see if I can find a citation here on this. I believe if you look at 40 CFR 761.68(5)(3) there is a provision, and this would require EPA's approval, but it allows for it, to "upon application, using a disposal method to be approved by the agency's regional administrator in the EPA region, which the PCBs are located", allows for the disposal of dredged materials containing PCBs of concentrations of 50 PPM or greater.

What that does is allow, although TSCA requires a lot of solids to be sent to an incinerator, EPA recognizes the difficulty in handling large volumes of sediment generated from dredging. And they put this provision in there to allow EPA on a regional basis to decide what would be a practical, and technically sound, and environmentally acceptable solution.

So there is a provision, if EPA would accept in, and decide it to be technically feasible and environmentally sound, to allow that disposal to occur.

MR. ANASTASI: If you're considering this really permanent then I wonder if you took into consideration the possible release scenarios associated with catastrophic events, similar to what could have happened if a hurricane came up the coast and caused some major disturbance in this area. And I'd like you to comment on the appropriateness of your 50 year storm as the design basis, if you will, for the cap?

MR. SERAPAS: First, you probably know that our fifty year storm equals most other people's hundred year storm. We statistically evaluated the actual site data, and fifty years was as far as one could accurately predict the storm. However, the NUS group, the Army Corps group and FEMA all believe that flow to be equal to, or less than, a one hundred year storm.

So we conservatively predicted a fifty year storm, based on a statistical analysis, where other people, three other people's analysis indicates that to be a one hundred year storm. That's number one.

We assumed all of that water would run through that reach of the river, and underneath the Tarkin Hill and Woods Street Bridge without overbank flooding. There are physical limits as to how much water that channel can carry before you begin to have flooding. I believe we are getting close to the limits of how much water that channel can carry before flooding occurs.

For example, we have talked to people who live along the banks, to gather anecdotal information, and the river has come out of its banks during lesser storm flows than the one we are predicting. We talked to people along the shore line of the river.

Nevertheless we still modeled all that water through, and we will design the cap with a safety factor to protect from the erosive forces from that surface water event, the rainfall event.

In terms of the hurricane, New Bedford has now the benefit of a hurricane barrier, which is operated, I believe, and I might ask Mark, something like when the water gets to be above MSL, the operating guidance document -- I have that if you want me to pull it out, the exacting citing. But it requires the barrier to be closed. And I understand the barrier is closed a few times a year, in anticipation of a storm. I was here once when that happened, an anticipation of a storm. Not waiting for that to occur.

If it didn't the estuary is sort of protected by these storm surges through the restrictions in circulation that occur at the Route 6 bridge, the I-195 bridge, and the Coggeshall Street Bridge. That sort of provides a little dampening of the flood flows or the storm surges and such.

So we've looked at what could come up and what could go down, and I think we have a relatively conservative design.

I should say that in doing our erosion protection modeling we're looking at a worst case. I.e., that storm wall of water comes down at low water, and the lower the water is the worse it is for the cap. We've tried to take what is a reasonable worst case scenario, and we actually even looked at the upper estuary with no water at all, just to see what that looked like. But we're going to size for mean low water, which is the worst condition possible.

Any water at all on top of the cap will only make the erosive forces less.

MR. ANASTASI: Do you think it's appropriate to look at any other type of events, like an earthquake, a nuclear plant siting? That's commonly done?

MR. SERAPAS: I don't think an earthquake is going to have a really significant effect on the cap itself. It may tear the fabric. It may cause some decrease in thickness. But I think if an earthquake occurs, that may be one of the lesser effects in the New Bedford area. They may have more fuel tanks spilling into the harbor, which are sited right on the edge, rather than damage to the cap.

MR. ANASTASI: Would you care to elaborate on the reference to the air photos, and the suspended sediment plume that's mentioned in your document?

MR. SERAPAS: Rick, would you like to speak to that?

MR. HUDO: I'm Rick Hudo, Rizzo Associates.

Frank, during the pilot dredging program we went out several times and collected sediment and water samples, first of all sediment samples before dredging, and then we needed some baseline monitoring similar to what EPA and the Corps did, and then monitored the sediment plume, so to speak, during the deployment of each of the dredges. We also took a series of air photos on two different occasions, one of which was during the Cutter Edge dredge pilot testing. And the photo we're talking about, I think we supplied to Lydia. Did we send you a copy, Lydia? All right.

MR. ANASTASI: Well, the series of photos shows plumes from all the things Mark mentioned, including the work done on the CDF dike, in the areas of the silt curtains. It also shows what I think is a pretty well defined plume that has its origin at the dredge and moves out towards the silt curtain, and joins the other plumes so to speak.

You heard the distance estimates earlier, when we were talking to the E.C. Jordan guys. What would you say the extent of this plume is?

MR. HUDO: What it does is joins the plume that was out by the silk curtain, so from an aerial photo, from monitoring, it would be hard to tell one plume from the other, and with the PCB measurements it might be hard to because of the real low levels that were there in the pilot test area.

But the distance is, for a visual plume, they are probably fairly accurate numbers they gave. Again, the one from the dredge area joined the one by the silt curtain, and the one by the silt curtain joined the one in the CDF area. And there was a CSO discharge in that time period also, so it looks like the plume was all the way down, but it's hard to separate the individual ones.

MR. ANASTASI: One of the criticisms of the EPA method is the dispersion, the resuspension of the sediments. But I just wonder what your estimate is of the similar type of adverse impact of deploying the geo-textile and laying down a cap. Because your criticisms of the EPA proposal, working out the resuspending, you guys are going to be doing things out there too, and I just wonder if we can't have it both ways.

MR. SERAPAS: I think the operations are quite different in nature. In fact, that was one of the things we looked at pretty closely, that drove us to putting the geo textile down as an initial phase. Once the geo-textile is down, the chances of resuspending sediments is quite low, and the purpose is really to provide a physical barrier from cap placement, cap placement activities in the sediments from the underlying sediments.

And so the trick them became to figure out how to install this geo-fabric without stirring up the bottom sediments. And there are figures which conceptually show how that works. We've talked to marine geo-technical engineers, and marine construction engineers on how that can be done. And you do it, I think, in a manner that the Corps resolved on how you move the dredge. Because, from my reading of the report, which was brief, they had difficulties with prop wash. You move a big piece of equipment around, and it can blow up a lot of sediment.

So they built and installed some dead men, some heavy weights on the sides, and that they can then winch to, and pull a machine or barge back and forth. And we would use that means also to install the geo-fabric. You would, in essence, winch a fabric deploying a barge across, turn it around, and winch it back.

And we've even gone so far as to look at things like air boats instead of large motor boats, to carry people around, and to be around to keep things in line.

So we have looked at it pretty closely. I think it can be done without disturbing a lot of the sediments.

MR. ANASTASI: One of the numbers you were throwing around when you were talking about the degradation of the PCBs, five years to a hundred years for a half life of some of these, I just want to be sure that that is what you were saying, and if you're talking a thousand years for PCBs to travel up through the cap. And, you know, that's a long time, but that certainly seems like a good cap.

I just want to know what these things are based on, and what kind of concentrations for some of the more toxic aerochlors in the hot spot would you predict?

MR. SERAPAS: I'd probably refer you to this EPA report, which is pretty recent, August 30, 1989. It's very similar to the results of John Brown, in a document that I believe he'll be releasing some time next month.

MR. ANASTASI: If you've got, let's say, what's the upper limit of the PCB contamination in the hot spot? 100,000 parts per million? What do you estimate a hundred years from now that concentration would be?

MR. SERAPAS: I don't have an answer for that. I guess I'd like to look at these rates and give you an answer that's more founded than off the top of my head.

MR. ANASTASI: That's what you were working towards when you mentioned something about October 1st, that you were looking at---

MR. SERAPAS: That is what we were working at. We were looking at rates for all the PCBs. The way that these rates are derived is to compare chromographic patterns from the samples to aerofleur standards. And there are shifts in the pattern, and the shifts in the pattern indicate the disappearance or degradation of certain components of the PCB, and then the creation of new peaks, which is metabolite. And that's where I was talking about the number of years, less than five years to hundreds of years.

In terms of getting rid of all of the PCBs, I don't think there is a definitive answer for that. But let me look here for a second, and see if I can find an answer in this report. I'll let you look at that later.

MR. ANASTASI: I think the big difference between the PRP proposal and the EPA proposal is EPA is saying: "We're going to remove the PCBs from the system", and your proposal is to leave them there for an uncertain time.

And I think to give anyone any kind of basis for making a decision, it would help to have some idea of what you're selling these people to live with.

And the other point would be the metals, and EPA's proposal is to do something about the metals, either remove them from the system physically, or fix them, leave them there so they are essentially removed.

MR. SERAPAS: Let me answer your question in a different way. You were concerned about what happens after a thousand years. Say no PCBs are destroyed, none. The flux rates through the cap after breakthrough, after a thousand years, are less than a pound per year. That's how much comes through the cap, assuming no degradation. It's less than a pound per year. That's what we predict the cap to do.

Now we haven't modeled metals. We can model metals if that becomes a priority. But the cap does serve to immobilize metals also. We haven't modeled them, but they are kept there. They follow the same contaminate transport mechanisms also. And I believe their flux rate to be significantly reduced also.

MS. VON HIME: Could I ask a question? This is Lydia Van Hime speaking. When you put a cap down, and you get compaction, does that increase the vertical component of pour water movement?

MR. SERAPAS: Yes, it does.

MS. VON HIME: Significantly?

MR. SERAPAS: We were concerned that during consolidation the displacement of all that water, the fore water, and the sediment, was going to wash up through the cap. And the amount of water that moves through just doesn't do that much. And it's because the solubility of PCBs is so low. It's the saving grace for this contaminate.

MS. VON HIME: Thank you.

MR. ANASTASI: With your proposed remediation, when is it going to be okay to fish and take lobster in the area?

MR. SERAPAS: Do you want to try to address that? I mean right now we're getting more data all the time. We looked to be pretty close to the FDA limits in most species excluding lobster liver, pancreas tamale, right now, in terms of tissue or flesh. But we have done some predictive modeling on that, and I'll let Weldon speak to that.

MR. ANASTASI: Doesn't the FS state that there has been no depreciable or observable reduction in the body burdens of these?

MR. SERAPAS: That's an interesting point. The method of analysis is since when?

MR. ANASTASI: I believe it's a decade that's mentioned. There's two studies that are compared. Help me out, Doug?

MR. DUMONT: It's EPA accrual data.

MR. BOSWORTH: The information that we have seen, on particularly body burdens of species that would be of concern, actually two years Battelle published a report that looked at the edible tissue concentration of PCBs. And even in area one, up in the upper estuary, the lobster and the winter flounder was below the FDA limit.

So if you're using that as a criteria I guess one could say you could probably eat them now, as long as you didn't eat the lobster tamale.

One of the things the cap does, in terms of not only decreasing the flux, but in capping all of that which is over 50 parts per million, our first attempt at modeling, and I don't think this has been done yet by EPA either, but we did do a very simple box model to try to provide a first order of approximation of resultant water concentration of PCBs, and the initial results looked to be somewhere between 15 and 30 nanograms per liter, which is pretty much below the EPA chronic limit.

Now we're going back and going to do a hydro dynamic model to verify or to check those results. But that's a very interesting result. That says that from a biological or toxicological standpoint you're going to be reducing a substantial amount. In fact, in the upper estuary that's about a hundred-fold reduction in the water column concentration, through having capped that area.

Now to translate that into body burden data, we are left with some very uncertain tools in using that. One of the new guidance documents to the sediment quality criteria that's out, that's just in draft form now, attempts to set sediment concentration limits that they specify will be protective of the organisms in the area such that they will not accumulate PCBs in the tissues above the FDA guidelines.

Now if one were to apply that you would conclude that somewhere on the order of 20 to 30 parts per million would be the maximum amount of sediment concentration you could have, and not have endemic species body burden to go above that FDA limit.

However, we have real data that shows that even in a situation where the sediment quality concentration of PCBs exceeds, in some cases substantially, that twenty to thirty parts per million that sediment quality criteria would predict, that we're left with organisms up there that either metabolically, physiologically or through some environmental conditional factor, have not increased their body burden above the two parts per million.

Now in the report that Battelle put out, they don't offer an explanation for that, and the food chain model is not yet available to us to try to, in any way, verify how that could be. We know what the bioconcentration factors would be predicted by that, from a review article, but it's kind of difficult to put some of those pieces together.

The only real solid information I can see is that study by Battelle.

There have been references, both in the hot spot feasibility study, as well as other documents, I believe a risk assessment, that say there is not much evidence of decreasing body burden. There isn't much data to make that conclusion in my estimation. The only long term data is the Mass Division of Marine Fisheries. And that has a few problems in the data, internally consistent decisions resulting from that data.

So it's kind of tough to answer that question.

MR. ANASTASI: So you're saying that by implementing this remedy relatively soon after remediation it sounds like.

MR. SERAPAS: I don't know, Weldon, if you want to discuss the implications of reducing the PCB water column, the PCB concentration in the water column. But if one uses and believes in the bio concentration factors that are referenced -- is it in another one of the Battelle documents?

MR. BOSWORTH: That's the hydrochlor review.

MR. ANASTASI: I think the point has been made on that, but that's the answer to my question then essentially. I guess I hear there's disagreement among the camps here, of the appropriateness of lobstering and fishing there.

MR. SERAPAS: I think there's been different sampling methods and different analytical methods, and I think that's arisen at another one of these meetings earlier, that we had these two divergent data sets that, from what we've been hearing, some people are taking whole organisms, grinding them, and submitting them for analysis. Well, that can result in a lot higher PCB concentrations that may not be reflective of what you eat. And that doesn't take into account the losses that occur during cooking or such.

But what are you really measuring? And, furthermore, was this the analytical method appropriate?

MR. ANASTASI: Unfortunately, most of these investigations end up with a lot of different types of data.

Does your reference to re-establishing wetlands, and salt marsh and all? I just wondered in the document it never comes out and says "you're going to have a net gain or net loss of wetlands." Do you have an idea?

MR. BOSWORTH: I think nineteen acres of additional salt marsh.

MR. ANASTASI: That's additional then? You're saying a net gain?

MR. BOSWORTH: Salt marsh. Right.

MR. ANASTASI: I probably didn't read that carefully, whether that was nineteen.

MR. BOSWORTH: Yes, that's the net gain.

MR. SERAPAS: In our conversion there will be a pre and post habitat chart. But we had planned to mitigate with an additional nineteen acres of salt marsh.

MR. ANASTASI: I guess my final comment would be, you seem to place a lot of the basis for success of this in place capping on the James River and the Duwamish Watershed projects, and I don't recall, but I think these two are also relatively short. We're not talking about a thirty year history of stability or anything.

I guess I would just say that it might help your case to present some of those reports, and also the sampling data that shows that there hasn't been a release of the ketone back into the river.

MR. SERAPAS: We could do that. So you would want more detail on the capping sites?

To be honest, this is a new science, and the James River was pre ERA. But monitoring data for these kinds of sites, long term data, is just non existent. The purpose of presenting those data was not to demonstrate that a cap would work. In fact, the James Rivers is just a naturally formed cap, but that it could be done, that a cap could be placed, and it could be effective.

MR. ANASTASI: It has been done. People have tried it.

MR. SERAPAS: For example, this is a recent environmental impact statement that came out. Apparently the DOT is planning to build a road across the James River with a bridge, and EPA region has recommended more study because of their concern of resuspending the sediments, resulting in -- this is September 15 Environment Reporter, it recommended more study because of their concern with the immobilizing of the sediments, and spreading the ketone contamination.

MR. ANASTASI: Because the ketone is still there?

MR. SERAPAS: The ketone is still there.

MR. ANASTASI: I really don't have another comment now.

THE CHAIRMAN: Anybody else? That's it. That'll do it. I thank everybody for coming.

(Whereupon, the hearing ended at 9:15 P.M.)

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This is to certify that the attached proceedings before: Leon Chadwick, Chairman in the Matter of:

New Bedford Harbor Site

Place: New Bedford, Massachusetts

Date: 9/25/89

were held as herein appears, and that this is the true, accurate and complete transcript prepared from the notes and/or recordings taken of the above entitled proceeding.

V. Rasmussen Reporter	9/25/89 Date
P. Sullivan Transcriber	10/02/89 Date